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REPORT
No. 2356

INVESTIGATION OF THE USE OF CHEMICALS IN FOODS AND COSMETICS

JUNE 30, 1952.—Committed to the Committee of the Whole House on the State
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Mr. DELANEY, from the Select Committee To Investigate the Use of
Chemicals in Foods and Cosmetics, submitted the following

REPORT

[Pursuant to H. Res. 74, 82d Cong., 1st sess.]

FOOD

I. INTRODUCTION

The Select Committee To Investigate the Use of Chemicals in Food Products was created under the provisions of House Resolution 323 (81st Cong., 1st sess.), agreed to June 20, 1950. The resolution authorized and directed your committee to conduct a full and complete investigation of—

1. The nature, extent, and effect of the use of chemicals, compounds, and synthetics in the production, processing, preparation, and packaging of food products to determine the effect of the use of such chemicals, compounds, and synthetics (A) upon the health and welfare of the Nation, and (B) upon the stability and well-being of our agricultural economy;

2. The nature, extent, and effect of the use of pesticides and insecticides with respect to food and food products, particularly the effect of such use of pesticides and insecticides upon the health and welfare of the consumer by reason of toxic residues remaining on such food and food products as a result of such use; and

3. The nature, effect, and extent of the use of chemicals, compounds, and synthetics in the manufacture of fertilizer, particularly the effect of such use of chemicals, compounds, and synthetics upon (A) the condition of the soil as a result of the use of such fertilizer, (B) the quantity and quality of the vegetation growing from such soil, (C) the health of animals consuming such vegetation, (D) the quantity and quality of food produced from such soil, and (E) the public health and welfare generally.

The committee was appointed by the Speaker of the House on July 20, 1950. House Resolution 739, agreed to August 21, 1950, appropriated \$30,000 from the contingent fund of the House to finance the investigation. Public hearings were held during the months of

September, November, and December, 1950. Twenty days were devoted to these hearings, in which 74 witnesses were heard.

On January 3, 1951, the committee submitted its report (H. Rept. 3254, 81st Cong., 2d sess.), which summarized the testimony presented to it and recommended that further study and investigation be undertaken before final conclusions were reached. At the close of the Eighty-first Congress, the committee had expended \$13,181.43 of the \$30,000 appropriated for its investigation. The unexpended balance of \$16,818.57 was returned to the contingent fund of the House. Of the sum expended, \$3,668.46 were paid to the executive branch of the Government for the services of personnel loaned to the committee on a reimbursable basis.

On February 2, 1951, the House agreed to House Resolution 74 (82d Cong., 1st sess.), which provided:

That effective from January 3, 1951, the select committee created by House Resolution 323 of the Eighty-first Congress is authorized to continue the investigation and study begun under authority of such House Resolution 323 and for such purposes shall have the same power and authority as that conferred by such House Resolution 323. The committee shall report to the House (or to the Clerk of the House if the House is not in session) as soon as practicable during the present Congress, the results of its investigation and study, together with such recommendations for legislation as it may deem advisable.

House Resolution 128 (82d Cong., 1st sess.), agreed to February 20, 1951, appropriated \$75,000 from the contingent fund of the House to finance the committee's operations. Of this amount, approximately \$45,000 will have been expended by the committee at the conclusion of its deliberations. It is estimated that \$30,000 will be returned to the contingent fund of the House. Approximately \$25,000 of the expended amount will have been paid to the executive branch of the Government for the services of personnel borrowed by the committee on a reimbursable basis.

On October 15, 1951, the House agreed to House Resolution 447 (82d Cong., 1st sess.), which extended the scope of the committee's authority to include:

* * * an investigation and study of the nature, extent, and effect of the use of chemicals, compounds, and synthetics in the production, processing, preparation, and packaging of cosmetics to determine the effect of the use of such chemicals, compounds, and synthetics upon the health and welfare of the Nation.

Pursuant to the instructions contained in House Resolution 74 and House Resolution 447, public hearings were held during April, May, June, October, and November, 1951, and January, February, and March, 1952. The committee devoted 39 days to public hearings, in which 143 witnesses were heard. During the whole life of your committee, 59 public hearings were held and 217 witnesses presented their views. These witnesses included representatives of the American Medical Association, American Dental Association, American Public Health Association, New York Academy of Medicine, National Research Council, United States Public Health Service, United States Food and Drug Administration, United States Department of Agriculture, Association of State and Territorial Health Officers, American Cancer Society, Grocery Manufacturers of America, National Canners Association, National Agricultural Chemicals Association, Manufacturing Chemists' Association, National Fertilizer Association, American Plant Food Council, General Federation of Women's

Clubs, Cooperative League of the U. S. A., American Home Economics Association, National Council of Farmer Cooperatives, National Grange, and National Farmers Union.

Various other witnesses, representing the chemical industry, the fertilizer industry, the pesticide industry, the food industry, the cosmetic industry, professional groups and consumers' groups, as well as expert witnesses from colleges, universities, and agricultural experiment stations, were also heard.

It has been estimated that over 700 chemicals are presently used in or on foods. It was manifestly impossible for this committee to study exhaustively every phase of food production, or every chemical used in this industry. The chemicals, and phases of food production, which were subjects of more intensive investigation than others, were selected on the basis of their importance to the public health and economy of the Nation.

In the interest of simplicity, your committee proposes to divide the subject matter of its investigation into four sections and prepare a separate report for each section.

The first two reports, submitted on May 12, 1952, and June 17, 1952, were entitled, respectively, "Fertilizers" and "Cosmetics." The third report, which is respectfully submitted, is entitled "Food."

II. NATURE AND SCOPE OF THE PROBLEM

Tremendous progress in the science of food technology has been made in the comparatively recent past. The growth of population, in this country and abroad, has increased the need for greater crop yields of high quality, and this need in turn has resulted in the rapid development of pesticides to combat insect infestations and plant disease. Specialized farming, which makes it necessary to ship crops to distant points, together with the need for long storage periods, has provided an impetus for the introduction of various methods of food preservation. The increasing world demand for a more abundant food supply has accelerated the growing tendency to utilize synthetics not only to enhance food flavor and appearance but, more important, to prevent waste and spoilage.

At this stage of our civilization, there is a genuine need for the use of many chemicals in connection with our food supply. Many of the chemicals directly added to foods have proved to be of substantial value to the consumer, and constitute a necessary adjunct to modern civilization. Few would quarrel now with the advisability of enriching various staple foods with certain vitamins and minerals, or with the addition of other chemicals which enhance the nutritive value of the products in which they are incorporated. The addition of iodine compounds to salt to prevent goiter has proven of real benefit to the consumer in areas where there is an iodine deficiency in the diet. Furthermore, substances added to a food during processing for such functional purposes as discoloration prevention sometimes result in the enhancement of its nutritional value. As example is the improvement in the vitamin C content of frozen peaches when ascorbic acid is added to prevent unsightly browning of the cut fruit.

The American public may feel justifiably proud of the manner in which the scientists of this country, in conjunction with the food and chemical industries, have solved the many serious food problems which

have arisen. In the judgment of the committee, the food industry is entitled to considerable credit for the progress of research in the field of nutrition and the practical application of such research. This has resulted in an improvement in the health and nutritional status of millions. Nevertheless, the public is in need of protection against small, irresponsible elements, as well as against the possible inadvertent mistakes of reputable food processors and premature enthusiasts of chemical manufacturers.

The rapid strides in the application of science to the production and processing of food offer great possibilities for the welfare of mankind. The progress that has been made in food technology, however, has been attended by a certain degree of hazard, since some quantity of many of the new chemicals utilized in the production and processing of foods is inevitably ingested by the consuming public. It is essential that this risk be kept to a minimum.

The number of chemicals entering the food supply of the Nation has increased tremendously in the last decade. Chemical substances are being introduced into the production, processing, storage, packaging and distribution of food at an ever-increasing rate. There is hardly a food sold in the market place today which has not had some chemicals used on or in it at some stage in its production, processing, packaging, transportation, or storage. These foods include those eaten by every family, ranging from staples like bread to such luxury items as the maraschino cherry. Some eminent pharmacologists, toxicologists, physiologists, and nutritionists expressed the fear that many of the chemicals being added to food today have not been tested sufficiently to establish their nontoxicity and suitability for use in food. These scientists are not so much concerned with the acutely toxic compounds, whose harmfulness can readily be detected, as with those chemicals which may produce harmful effects only after being ingested for months or perhaps years.

The indirect addition of chemicals to our food supply also raises serious problems. For example, cattle are being treated with antibiotic drugs in the control of mastitis, anthrax, and other diseases. There is a question whether the presence of small amounts of antibiotics in milk and milk products has any effect on the consumer; that is, whether the consumer develops a sensitivity or resistance to these chemicals. In such cases, the resistant or sensitive individual would be unable to benefit from treatment with these valuable drugs in the event of illness (1).

The United States Food and Drug Administration, in collaboration with the United States Public Health Service, revealed that approximately 842 chemicals are used, have been used, or have been suggested for use in foods. Of this total, it was estimated that 704 are employed today, and that of these 704 only 428 are definitely known to be safe. Thus, there are approximately 276 chemicals being used in food today, the safety of which has not been established to the satisfaction of many groups concerned with the health and safety of the public (2).

The Surgeon General of the Public Health Service pointed out that the extent of this problem cannot be fully visualized, because of a lack of adequate information on the chronic effects of chemical substances currently in use. He testified that the toxic effects of many of these chemicals, and of the compounds which they form when introduced into food, are unknown. He expressed concern over the

possible adverse effects which chemicals used in food products may have upon human health (3).

The American Public Health Association has stated that the toxicologic properties of many of the chemicals used in the production and processing of foods, especially the chronic effects of their long-time consumption, are not known. The Council on Foods and Nutrition of the American Medical Association has described the increasing use of chemicals in food as a potential health hazard which may become one of the greatest problems the food industry has ever had to face (4). The situation was outlined by the Commissioner of the Food and Drug Administration as follows:

It would be both unfair and incorrect to appraise this problem on the assumption that we have an irresponsible chemical industry and an irresponsible food industry, both callous to the health of consumers. Nor can we appraise it on the assumption that this is just a bureaucratic grab for dictatorial powers over the food and chemical industries. The facts belie both assumptions; but the facts show that there is a fringe of the careless or ignorant or unscrupulous who have used or are now using chemicals in food without sufficient testing to be reasonably certain they will not impair the health of consumers. We have seen insecticides marketed before toxicity tests were made, other than those required to show the LD₅₀, and before adequate quantitative analytical methods were developed. We have seen the paradox of vigorously pressed sales campaigns for chemical additives while tests to discover unknown facts about their toxicity were being planned or carried out.

That the dramatic equivalent of the elixir sulfanilamide disaster of 1937 that cost more than a hundred lives has not occurred in the food field speaks volumes, first, for the conscientiousness of these industries generally, and second, for the providential luck of the fringe operators—and of the public. We have had some narrow escapes (5).

One problem which is causing scientists increasing concern is the possible effect of various synthetic substances in the production or acceleration of cancerous growths. The testimony proffered was not that certain chemicals presently in use as additives and insecticides do cause cancer, but rather that there is a definite lack of knowledge on the subject (6). The head of the Nutrition Unit in the Biochemistry Section of the National Cancer Institute set forth the situation in the following language:

In summary I have pointed out: (1) That a large number of chemical compounds induce cancer in animals. (2) That there is no way of predicting their cancer-inducing properties without a biological test. (3) That the careful testing of chemicals for cancer-producing properties in animals is exceedingly difficult to evaluate. Any test for cancer is influenced by a very large number of environmental and hereditary factors which the experimenter must seek to control and evaluate. I believe any estimate of the possible injurious properties of chemicals added to nutrients consumed by men should include careful testing for their carcinogenic properties in several species of animals prior to approving their use in food (7).

Nor is the problem confined to inadequately tested insecticides or other chemical substances added to foods. Paper, fiber, and plastics are becoming increasingly popular as food containers and food-handling equipment. These, together with the use of chemicals in wrappers, may create a hazard to health. It is obvious that the toxicity and potential danger of these materials should be studied before their use in the food industry is permitted.

In addition, although many chemicals, as already indicated, serve a useful purpose to the consumer, others do not and may in fact conceal inferiority, adversely affect the nutritive value of the foods in which they are employed, or act as substitutes for nutritious ingredients (8).

The committee wishes to point out that the United States Food and Drug Administration, the United States Public Health Service, the United States Department of Agriculture, as well as comparable State agencies, industry and colleges and universities, are devoting considerable time and sums of money to research and experimental work for the purpose of obtaining solutions to these problems.

III. THE USE OF CHEMICALS IN THE PRODUCTION, PROCESSING, PRESERVATION, AND PACKAGING OF FOODS

There is nothing objectionable per se in the introduction of chemicals in the production, processing, preservation, and packaging of foods (9). However, some chemicals have been employed which proved harmful or which were utilized before their harmlessness had been established. A few of these will be discussed.

NITROGEN TRICHLORIDE

Nitrogen trichloride, commonly referred to as Agene, was employed for approximately 30 years in the flour-milling industry. It was used primarily to age artificially certain types of flour. In 1946, an English investigator discovered that dogs fed bread baked from flour treated with nitrogen trichloride developed canine hysteria, commonly referred to as running fits. Experiments by qualified investigators in this country soon confirmed these results in experimental work on dogs as well as other animals, but they were not able to establish any injury to humans. The baking industry and the manufacturer of Agene agreed that it should not be employed in flour, whereupon a hearing was held by the Food and Drug Administration and such use was prohibited (10).

THIOUREA

In 1946, a chemical known as thiourea was proposed for use on citrus fruit to prevent a certain type of mold. Before it was so employed, the persons proposing its use consulted with the Food and Drug Administration. Experiments were conducted which showed that thiourea, in addition to being very poisonous, penetrated the skin of citrus fruits and found its way into the juice. As a result of these investigations thiourea was never used on citrus fruits, but several shipments of frozen peaches containing the substance were seized and destroyed. Less cautious food manufacturers might have proceeded to use it, as permitted under existing law, without consulting with the Food and Drug Administration and before determining the toxic properties of the substance, as in the case of the manufacturer of the frozen peaches. Were it not for the fact that all of the contaminated peaches were seized before they had reached the consumer, a serious poisoning episode might have occurred (11).

PARA-PHENETYL UREA

Para-phenetyl urea is a sweetening agent which was used for over 50 years as a sugar substitute for diabetics and others. Until the Food and Drug Administration undertook a chronic toxicity study of this substance several years ago, no investigation of its possible toxic

effects when ingested in small amounts, over an extended period of time, had ever been made. Results of the experiment revealed that para-phenetyl urea is poisonous under such conditions. One firm continued to use it in its food products even after being warned of its toxicity. At that time, action could not be taken against the firm because the toxicity studies had not been completed (12).

LITHIUM CHLORIDE

A salt substitute containing lithium chloride was marketed several years ago for persons required to be on a low-salt diet. Subsequently, it was discovered that the substance is extremely poisonous for persons who have been on such a diet for some time, so that the salt content of the body has been reduced. Action was taken immediately and preparations of salt substitutes which contained lithium chloride were removed from the market, but several deaths had occurred (13).

MINERAL OIL

Mineral oil was long regarded as harmless. It had been used in a variety of special dietary foods, particularly salad dressing, as a substitute for food oils. Between 1941 and 1945 evidence became available which showed that mineral oil, when taken with foods, interferes with the absorption of various vitamins. As a result of this evidence, mineral oil is no longer permitted as a food ingredient (14).

MONOCHLORACETIC ACID

Monochloroacetic acid was used by a number of food manufacturers as a food preservative. Experimental work performed by the Food and Drug Administration revealed that the substance had an acute toxicity comparable to such recognized poisons as bichloride of mercury, carbolic acid, and strychnine. The Food and Drug Administration then announced that the acid must be regarded as a poisonous and deleterious substance which should not be used in food products. Notwithstanding this, many foods containing monochloroacetic acid were subsequently placed on the market. In one instance, a synthetic orange-type beverage containing the substance was distributed widely in the South and caused extensive digestive upsets of a very acute type (15).

DEHYDROACETIC ACID

In March of this year, the Food and Drug Administration seized more than 6,000 pounds of cheese because it was enclosed in a newly developed wrapper containing dehydroacetic acid, which transfers from the wrapper to the cheese and is readily absorbed in it. The chemical had been used to prevent the growth of mold on the cheese, and was odorless and colorless. The Food and Drug Administration has declared that dehydroacetic acid has the toxicity of carbolic acid (16).

EMULSIFIERS

During the past 14 years, a number of substances referred to as emulsifiers or surface-active agents have been used in a wide range of foods. The emulsifiers fall into four main categories: (1) mono- and

di-glycerides of fat-forming fatty acids, which are formed by reacting glycerin with fat; (ii) a class of compounds produced by reacting sorbitol, a sugar alcohol, with a fatty acid; (iii) a class of compounds produced by reacting a sorbitan ester of a fatty acid with polymerized ethylene oxide; and (iv) polyoxyethylene monostearate, which is prepared by reacting polymerized ethylene oxide directly with a fatty acid, or by first reacting ethylene oxide with water to form a glycol and then reacting the polymerized glycol with a fatty acid. By varying the fatty acid and the length of the polymerized ethylene oxide chain, a great many compounds may be made in each class (17).

In 1937, it was found that when small amounts of mono- and diglycerides are mixed with shortening and the shortening incorporated into baked goods, their use resulted in what has been described as "more tender" bread, buns, cake, and other sweet goods. Thereafter, shortenings containing varying amounts of mono- and diglycerides were marketed. Subsequently, it was ascertained that, by increasing the ratio of mono- and diglycerides in shortening, a very soft loaf of bread could be produced. In 1947, when the polyoxyethylene monostearate type of bread softener appeared on the market, superglycerinated shortening and polyoxyethylene monostearate became competitive products in the baking industry. Thus, the name "bread softener" has come to mean preparations containing either mono- and diglycerides or polyoxyethylene monostearate. In addition to their use in shortening, mono- and diglycerides are used as emulsifiers in prepared cake mixes and in the ice-cream industry, where they compete with the polyoxyethylene monostearate type of emulsifier.

Mono- and diglycerides are said to occur in small quantities in some natural fats, and are present in small amounts in the animal intestine during the digestive process, but heretofore they have not been ingested in amounts comparable to the amounts being added to some shortening.

The principal food uses of the types of emulsifiers referred to above as classes (ii) and (iii) are in prepared cake mixes, baked goods and ice cream. They are also utilized to some extent as dispersing agents in flavors, essential oils and polyvitamin solutions. The last main class of emulsifiers, polyoxyethylene monostearate, referred to above as class (iv), is employed primarily in the bread industry as a bread softener. At the hearings held by the Food and Drug Administration to prescribe definitions and standards of identity for bread, rolls and buns, certain of these three classes of emulsifiers were proposed for use in bread and the results of a large number of experiments with these categories were presented. A large part of the hearings was devoted to the presentation and interpretation of this data. The Administrator of the Federal Security Agency has issued a regulation which contains a finding of fact that the evidence is not sufficient to warrant the conclusion that there is no likelihood of injury from bread containing the substances comprising groups (ii), (iii), or (iv), if ingested continuously over the human life span (18).

On November 9, 1951, the Food Protection Committee of the National Research Council announced that it had made a study of the experimental data on both the mono- and diglycerides and the polyoxyethylene type of surface active agent proposed for use in foods. Its opinion was that the available data "on the toxicity, tolerance, metabolic fate, and nutritive value of these surface active agents proposed

for use in ice cream are insufficient to permit a final judgment as to the safety of the substances for use in foods" (19).

These substances are being used in tremendous quantities and have been incorporated into many of the basic foods eaten every day, notwithstanding that there is a definite controversy among reputable scientists as to whether the compounds are safe for use in food. Adequate and comprehensive experimentation and research may reveal that they do not present a danger to the public. It is clear, however, that some of these compounds, at least, were injected into the Nation's food supply without sufficient testing to insure beyond a reasonable doubt that their use did not create a long-range health hazard (20).

As early as July 2, 1949, the Council on Foods and Nutrition of the American Medical Association issued an official statement on the use of the chemical emulsifiers in food. This statement said in part:

Available knowledge of the possible toxicity of these substances is fragmentary; particularly is evidence lacking as to chronic toxicity. The employment of these agents in the processing of such basic foods as bread and bakery goods, as well as other foods (such as ice cream, candy, and peanut butter), could lead to the ingestion of considerable quantities of these materials of uncertain toxicologic action. Unless the complete harmlessness of these agents can be demonstrated beyond a reasonable doubt, they should not, in the council's opinion, be employed in basic foods (21).

A representative of the American Medical Association testified that chemical additives may permit the lowering of the proportions of important food ingredients in the product and thereby result in a dilution or deterioration in nutritive value of the food, and recommended that:

Intentional chemical additives, especially those likely to find their way into basic foodstuffs or to find widespread application in a variety of foods, each of which may be infrequently eaten, must not be permitted until the complete harmlessness of these agents can be demonstrated beyond reasonable doubt. Furthermore, the use of additives which lead to a significant decrease in nutritive value should not be permitted (22).

This viewpoint on safety testing is similar to the position taken by the Food Protection Committee of the National Research Council in a release issued on December 11, 1951, entitled "Use of Chemical Additives in Foods," that "chemical additives should not be permitted in a food until their safety for a given food use has been established beyond a reasonable doubt, as judged by competent experts." Your committee is also of the opinion that the best interest of the public health requires that the manufacturer of a chemical proposed for use in or on any food, or a food manufacturer who develops such a chemical, should submit evidence to the satisfaction of the Food and Drug Administration that the chemical is safe for use, as far as the end food product is concerned, from both an acute and chronic viewpoint.

There have been no reported deaths due to the ingestion of foods containing untested chemicals. The Commissioner of the Food and Drug Administration testified, however, that we have had some narrow escapes. This was in accord with the views of the Director of the Bureau of Nutrition of the Department of Health of New York City, testifying on behalf of the New York Academy of Medicine, who stated:

I would hazard a guess, Mr. Counsel, that with the rapid expansion of the chemical industry—and, frankly, many people including myself think we are only at the beginning of the growth and usefulness of this industry—that without very

definite regulation a similar tragedy may occur, and it may be a far worse one than the sulfanilamide tragedy, because these chemicals will be put in the food that will be more widely used and consumed than, say, a drug that is used only for sick people (23).

As previously indicated, it is heartening that various Federal and State agencies, as well as industry and scientific groups, are devoting themselves with the utmost diligence to research directed at the protection of the public health. The committee recommends that such activities in this vital field be augmented.

HORMONES IN FOOD PRODUCTION

The use of hormones and other similar substances for the purpose of improving the quality, and perhaps in some cases the quantity, of food has opened an entirely new field in food technology which may prove to be of great benefit to the consumer. At present, Government, industry and scientific groups are continuing their research and experimental work in this field to determine to what extent these preparations may be employed, and whether there is any hazard to the public health from these practices. The committee urges that such research in this important field be expanded.

The aspect with which the committee was particularly concerned was the use of diethylstilbestrol to fatten and tenderize poultry and livestock. It is estimated that in 1950 this chemical, in 15-milligram pellets, was used on approximately 30 million chickens, and its use is reported to be increasing.

Diethylstilbestrol is a synthetically produced chemical having activity very similar to the natural female sex hormones. Directions for use call for the implantation of one pellet into the upper region of the neck of the bird, at the base of the brain, about 4 to 8 weeks prior to marketing, during which period the chemical is slowly absorbed into the system of the bird. Male birds so treated rapidly lose many male characteristics; combs, wattles, and reproductive organs shrivel; and the propensity for crowing and fighting disappears. The flesh of birds so treated contains greater deposits of fat than the flesh of nontreated birds. This results in a heavier bird, with meat that is said to be more tender and of smoother texture, although there was testimony that the fat of fowl treated with stilbestrol differs chemically from that of normally fattened birds and is watery and inferior culinarily. Treated birds command a premium price on the market, and have been called "caponnettes" or "hormonized fryers." The results secured by this process are very similar to those obtained by surgically castrating the male bird, a procedure which has been in use for many years. The increasing popularity of the chemical method is due, for the most part, to the convenience of administration, for which no special training is needed. A mechanical injector, similar to a hypodermic syringe, implants the pellets quickly and efficiently just below the surface of the skin (24).

Diethylstilbestrol is a potent and dangerous chemical, which cannot be purchased in drug stores for medical purposes without a physician's prescription. It is used extensively by the medical profession to alleviate menopausal difficulties and dysmenorrhea, and to suppress lactation and excessive uterine bleeding. It has also been employed to ease the pain of prostatic cancer because of its action in shrinking

the male sex organs, thus reducing the pressure on the cancer. Stilbestrol has been shown to inhibit the growth of young rats and chicks, and has been used to prevent excessive tallness in girls (25).

The human body, female and male, requires and produces, for normal operation, quantities of both the female sex hormone (estrogen) and the male sex hormone (androgen). Among other things, these hormones determine and affect certain of the sex characteristics of the individual. Thus, proper quantities and proportions of these hormones may affect, among other things, sex drive, development of sex organs, breast development, quantity of facial and body hair, height, voice pitch, and the like. An imbalance of significant proportion between the male and female sex hormones in the body will result in the individual's acquiring some of the physical characteristics of the opposite sex (26).

Very few data have been published concerning the quantity of stilbestrol which may be found in the edible tissues of a treated bird. No one can state with any assurance just how much of this material remains in the tissue, although it was testified that the quantity is very small (27). There is practically no information concerning the effects of the long term ingestion of minute quantities of stilbestrol (28). The testimony of scientific experts concerning the safety of ingesting the flesh of stilbestrol treated poultry is in conflict (29).

Because of the tendency of living tissue to wall off foreign bodies, there is always the possibility that stilbestrol pellets will be isolated and not completely absorbed into the tissue of the chicken. In addition, a residual pellet will remain in the carcass if the bird is marketed prior to the expiration of the absorption period of 4 to 8 weeks. For this reason, and because it is generally agreed that the ingestion of portions of a diethylstilbestrol pellet may result in adverse physiological effects, directions for use of this material require the site of implantation to be high on the neck at the base of the skull, so that on slaughtering, the site of implantation will be removed and thrown away as the chicken head is severed (30).

Recently, the United States Food and Drug Administration sampled several lots of stilbestrol-treated chickens which had been shipped in interstate commerce. Examination showed that 60 percent of the sampled chickens contained portions of unabsorbed stilbestrol pellets in areas of the neck which would remain with the consumer after normal severing of the head from the carcass. Prompt legal action followed, and approximately 50,000 pounds of stilbestrol-treated chickens were seized and condemned (31).

It is obvious that the Food and Drug Administration, with its small staff of approximately 250 field inspectors to cover the entire country, cannot possibly hope to sample and examine every interstate shipment of food, drugs, and cosmetics. Inevitably, of course, many shipments of foods must traverse State lines without any examination. Where a potentially dangerous chemical substance is utilized in such a manner that only the user is exposed to harm if he ignores or abuses the direction for safe use of such material, little can be done by way of protective legislation or regulation except to require clear, explicit directions which permit safe usage. This is the case with medicine or drugs. The few who would experiment with their own health by ignoring the recognized or prescribed directions for use can harm

only themselves. However, in situations where an individual's abuse or disregard of directions for use of a potentially dangerous substance may adversely affect the health of innocent consumers, as in the case of stilbestrol-implanted poultry, regard for the public health requires the application of different rules of policy. Evidence of widespread abuse of directions for use in situations of that nature should be sufficient to forbid the use of the chemical for such purposes.

Recent experimental evidence, showing, among other things, that milk production and the weight of livestock can be increased by the administration of estrogen and other chemical substances may well complicate this problem (32). The adoption of such practices among livestock raisers may result in an increment of estrogen and estrogen-like substances in the dietary of the average consumer.

The committee is of the opinion that the meat of poultry or other animals which has been treated with estrogens be labeled so as to reveal that fact, and that restaurants serving such estrogen-treated food be required to advise customers to that effect.

IV. THE USE OF PESTICIDES

It is generally agreed that many food crops cannot be brought to complete and fully satisfactory maturity without the use of pesticides. It is also recognized that many of the chemicals used as pesticides are very toxic, and that great care must be exercised to prevent harmful residues from remaining on foods when they are marketed.

With the advent of the newer organic pesticides following World War II, the use of chemicals having pesticidal action increased markedly; and it is estimated that there are approximately 100 pesticidal chemicals now in use, and that over 30,000 pesticidal formulations have been registered for labeling and use by the Insecticide Division of the United States Department of Agriculture (33). The expansion in the use of pesticides has created serious problems. One of the disturbing things about the advance in insecticide use, and the discovery of new insecticides, was that many such substances were put into use although very little was known with respect to either their acute or chronic toxicity or about their fate after they were applied to food (34). In 1948, the Council on Foods and Nutrition of the American Medical Association declared that the appearance of the new insecticides had created a danger; that there was an appalling lack of factual data concerning the effect of these substances when ingested with food; and that the chronic toxicity to man of most of the newer insecticides was entirely unexplored (35). Subsequently, on January 28, 1950, the Council on Foods and Nutrition stated, in part:

The introduction of numerous synthetic organic pesticides offers promise for increasing the Nation's food supply and improving health through the control of insects and other pests. Past experience, however, indicates that poisons cannot be used safely on food crops without the development of certain fundamental knowledge concerning the poisons. What these materials will do to pests and food crops and to workers who handle them must be known, and there must be developed, also, a knowledge of what these materials will do to warm-blooded animals and man when small amounts of residue are incorporated in their foods. Furthermore, practical methods of analysis should be available to permit identification and measurement of residues that may persist on or in consumer products. Such essential information is undeveloped for many of the agricultural poisons now in use (36).

DDT

DDT, the first of the chlorinated hydrocarbon insecticides, became available in quantity in the United States during World War II. Toxicological work was carried on by representatives of the Government, who reached the conclusion that it was a reasonably calculated military risk to use DDT as a typhus and malaria preventive, and that as a sound military expedient the danger of injury to the troops was far less than the danger from such scourges (37). Shortly thereafter, growers began to use DDT on a variety of food crops, although there was little or no information available on the effect of the long-time ingestion of small quantities and its storage in body tissues (38).

As experience was acquired, the Food and Drug Administration found that DDT is absorbed and stored by the body in the fatty tissues, and that, if an animal is exposed to it for any length of time, it may accumulate there to a degree which will injure the animal. Toxicity tests showed that DDT can be stored at very low levels of intake, and its concentration in the body fat is magnified from 6 to 28 times the dietary intake; that a level of 5 parts per million in the diet of rats produced slight but definite liver injury; and that the rate of disappearance of DDT from body tissues is slow (39).

Subsequent to the widespread use of DDT in dairy barns and on cattle, it was shown that cows sprayed with DDT, or fed silage sprayed with it, or even housed in a barn in which it was sprayed, would accumulate DDT in the fat and eventually secrete it in the milk (40). Although the scientific literature revealed, as early as August 1945, that the milk of lactating dogs receiving DDT contained appreciable levels of the compound, it was not until March 1949, that a governmental warning was issued advising that DDT should not be used on dairy cows or in dairy barns (41).

Years of continuing research have provided a great deal of information, and much more is known now about DDT than when it was first introduced for agricultural use. Nevertheless, there is still sharp disagreement among the experts concerning the hazards associated with its use. On the one hand we are told that it is among the safest of insecticides, and on the other hand that its toxicity has been greatly underestimated (42).

It is apparent that many important questions are still unanswered. As late as March 10, 1951, the committee on pesticides of the American Medical Association reported that—

Chronic DDT poisoning may result from the ingestion of small amounts of the material over a long time. Since the chemical is irregularly absorbed, the level below which adverse long-range effects are absent is unknown (43).

Nor is the maximum quantity of DDT which can be taken every day with safety known (44). Scientists are still trying to determine the role of DDT in the metabolism of human fat and its practical relationship to the total health of man, whether DDT storage in human fat causes cellular injury or interferes with the chemistry of the cell, and whether stored DDT, if released into the system, will cause injury (45).

There is conflicting evidence concerning the DDT content of foods normally consumed by the public. It is clear, however, that DDT may be found at times in meat, milk, and other foods eaten by the public (46). The United States Public Health Service, concerned

over the possible hazards of DDT residue on food and their effect upon consumers' health, collected human fat samples from volunteers and found that the DDT content of the tissue ranged from zero to 68 parts per million and averaged 5 to 10 parts per million (47). Analysis of human fat samples for DDT made by the Food and Drug Administration showed an average concentration of 5.3 parts per million. Since all fat samples were taken from persons having no unusual exposure to DDT, it may be inferred that this insecticide is being stored in the tissues of the general population. Analysis of samples of human milk by the Food and Drug Administration disclosed an average concentration of 0.13 part per million. As yet, notwithstanding the extremely widespread use of DDT, clinical data are not available to assess whether or not danger may be associated with its storage in human fat (48).

Some witnesses took the position that the lack of reported deaths due to DDT is sufficient evidence of its excellent record of safety (49). In this connection, your committee accepts the view stated in May 1950, by the Food and Nutrition Section of the American Public Health Association:

Mortality records alone would seem to show that accidental deaths from toxic chemicals of all kinds are an insignificant part of the total causes of death. The toxicologic properties of many of the chemicals used in the production and processing of foods are unknown, especially the chronic effects of their long-time consumption in foods. Mistakes in judgment about the health qualities of chemicals introduced in foods may adversely affect the health of great numbers of persons. Just as fire prevention is an important part of the control of damage by fire, so also the effective control of chemicals introduced in foods may serve to prevent mass poisoning of the population. It does not seem that the consideration of preventive measures in this field should demand impressive statistics from the death records in order to justify the undertaking (50).

CHLORDANE

Chlordane is another of the chlorinated hydrocarbon insecticides which has been recommended for use in the household and on a variety of fruit and vegetable crops. It was first made available for commercial usage in 1947, and it has been used extensively. The Director of the Division of Pharmacology of the Food and Drug Administration testified that from a chronic viewpoint chlordane is four to five times more toxic than DDT, that it is stored in human fat at a much faster rate than DDT, and that he would hesitate to eat food that had any chlordane residue on it whatever. He stated that chlordane has no place in the food industry where even the remotest opportunity for contamination exists, and that it should not be used even as a household spray or in floor waxes. Food and Drug Administration tests show that pigeons have been unable to survive in a small room treated with chlordane, even after a thorough scrubbing with alkali and subsequent airing for several weeks. The American Public Health Association has stated that a study of the pharmacology of chlordane showed that degeneration of the liver and kidneys of experimental animals occurred as a result of chronic poisoning (51).

Chlordane is presently being employed on some food crops, and is being recommended for fly control in barns and other places on the farm, except inside dairy barns and milkrooms (52). Furthermore, United States Department of Agriculture Farmers Bulletin No. 2009,

"Storage of Small Grains and Shelled Corn on the Farm," issued in September 1949, and in current use during the course of the committee's investigation, recommends the use of chlordane for treating bins for storing small grains and shelled corn. However, representatives of the Insecticide Division of the United States Department of Agriculture testified that if a label were presented for registration recommending chlordane for use in storage bins for grains, such a label would be refused registration. The substance of their testimony in this regard was that no one had consulted with them on the advisability of recommending chlordane for such a purpose, and if anyone had, the Insecticide Division would have been opposed to such recommendation (53).

SELENIUM

Selenium is an elemental metal which, in the form of selenium compounds, has been used as an insecticide. Animal experimentation has shown that 3 parts per million of selenium in the diet will produce cirrhosis of the liver and that, if feeding is continued, the animals may develop cancer of the liver. The residue remaining on fruits or vegetables sprayed with selenium compounds is rather high. For example, on an unwashed apple it may be as much as 1 part per million, and since it will penetrate the skin it may accumulate in the apple in amounts up to 3 parts per million. The hazard is increased by the fact that selenium builds up in the soil, and can migrate from the soil into the growing plant and eventually appear in the fruit or vegetable (54).

A representative of the Food and Drug Administration declared that selenium should not be used as an insecticide (55). The Assistant Chief of the Insecticide Division of the United States Department of Agriculture testified that, if selenium had not been in use prior to the enactment of the Federal Insecticide, Fungicide, and Rodenticide Act of 1948, and had been proposed for insecticidal use for the first time after the enactment of that statute in 1948, "it probably would not have been registered" (56).

PHENYLMERCURY COMPOUNDS

Phenylmercury compounds are used quite extensively on fruit and vegetable crops as fungicides. Investigation of these compounds shows that they accumulate in the kidney and are very poisonous. Very small quantities taken into the body lead to measurable storage in the kidney with resulting damage to the organ. Although phenylmercury compounds may be used safely on some foods if the foods are carefully cleaned after harvest to remove residues, the order of toxicity of these substances is so high that it has been suggested that their use not be permitted on foods under any conditions (57).

BENZENE HEXACHLORIDE

Benzene hexachloride, originally thought to be relatively harmless to higher animals, now is known to have toxic properties similar to those of DDT, differing, however, in that benzene hexachloride appears in the brain tissue of the experimental animals to which it has been administered (58). Farmers and canners have suffered considerable

financial loss because of off-flavors resulting from the use of this substance on various crops. It was testified that benzene hexachloride tends to penetrate into the edible portions of some crops; that, due to its penetrating effect, no procedure has been developed which will completely remove residues or off-flavors resulting from its presence; and that processing in many instances tends to accentuate the off-flavor. It was also testified that benzene hexachloride residues may remain in the soil for several years, and under certain conditions of continued application may tend to accumulate and produce off-flavors in subsequent and different crops grown on the same soil (59).

The above illustrations present some examples of the hazards which may arise from the use of pesticides in or on foods. There are other pesticides presently in use or proposed for use whose safety has not been established. In some cases, toxicological and pharmacological studies have not been sufficient to establish their safety as recommended for use. In other instances, no reliable practical methods of analysis for the chemical or its breakdown products are available to determine the amount of harmful residue which may remain in or on the food. Obviously, such information is essential for the protection of both the public and the food processor and canner (60).

One of the country's larger food-processing companies, specializing in food for infants, pointed out that many of the insecticides were introduced solely on the basis of their insect-control efficiency. A representative testified that it was costing this company at least \$100,000 every year in attempting to keep pesticidal residues out of its food products. He stated:

Most of the difficulties with residues, which we have described, have been due to their general use before sufficient scientific information was available on residue stability, residue penetration, development of off-flavors in fresh or processed foods, their accumulation in soils, their effect on the over-all insect population, or the development of resistance in certain species of insects. The disturbed ecological relationships, which have often destroyed beneficial predatory insects, have allowed the build-up of other insect pests, which could not be controlled by normal spray procedures; this, combined with the development of resistance to specific insecticides, has resulted in control programs which have caused the build-up of excessive residues in the hope of achieving control, and when this was unsuccessful, the hasty and often ill-advised use of new and more effective insecticides which had not yet been thoroughly tested. The net result has often been the creation of residue or off-flavor problems more serious than those arising from the use of the original insecticide (61).

This was borne out by testimony from the former Commissioner of the Food and Drug Administration, who described the situation as follows:

One of the disturbing things about the recent advance in insecticides, in the discovery of new insecticides, has been that a great many very potent and valuable insecticides have been developed about which very little is known, either about their chronic or acute toxicity or about their fate after they are applied to food. In many cases we do not know whether the insecticide after application is absorbed into the body of the food, whether it is destroyed on weathering, whether it degenerates, perhaps, into some more toxic substance. There were even insecticides put out for which no chemical method of identification or analysis is known (62).

Satisfactory analytical methods of residue analysis are presently not available for many commonly used pesticides, such as chlordane, toxaphene, aldrin, dieldrin, and heptachlor (63).

A complicating factor in the evaluation of the use of pesticides is the tendency of some pesticides to accumulate in the soil, remaining there,

in some cases, for many years, and contaminating other crops grown during that period (64). Thus, the use of chlordane in the soil or on growing crops may result in its presence in the soil, in a relatively unchanged form, for at least a year (65). There is evidence that because of the great persistence of the toxicity of DDT, and its relatively high toxicity to many crops on the mineral soils on which it has been tested, residues harmful to the soil may accumulate under some conditions of use in as short a period as 3 to 5 years (66). Contamination, disagreeable odors and off-flavors of many food crops have resulted from pesticide penetration or its translocation from the soil to the plant (67). Many pesticides have been released for use before this type of information was available (68).

There is one aspect of this important problem which is encouraging. Some States have comprehensive laws and regulations dealing with the use of pesticides. The United States Department of Agriculture, the United States Food and Drug Administration, and the United States Public Health Service are conducting vital experimental work in this field. State agencies and universities and agricultural experiment stations are also carrying on exhaustive research. And industry is spending large sums of money in attempting to develop newer and more effective pesticides which are harmless to the applier, to crops and livestock, and to the consuming public.

V. THE USE OF CHEMICAL EMULSIFIERS TO REPLACE NATURAL FOOD SUBSTANCES IN BAKED GOODS

Chemical emulsifiers, which have been discussed earlier, are being used in appreciable quantities, and have been employed not only in commercial bread, but in cake, prepared cake mixes, ice cream, and many other foods. In most instances, the type of emulsifier is not indicated on the label of the food in which it is contained. Approximately 10 million pounds of the chemical softeners are employed in food products each year, at a cost to food manufacturers of several millions of dollars.

The commercial baking industry, with its production of bread, rolls, cakes, and other sweet goods, is a very important outlet for many agricultural products in addition to wheat flour (69). There are no reliable statistics on the composition of commercial bread, on the amounts of shortening and other ingredients used in its production, or on the reduced use of any ingredients resulting from the employment of chemical emulsifiers. Analyses of samples of bread provide data only on the composition of the samples at the time they are collected. Such surveys as have been reported are few in number and of limited extent and value.

Before the war, commercial bread bakers used an average of about 4 pounds of shortening to each 100 pounds of flour. During the war, due to the short supply of fats and oils, bakers were restricted to not more than 2 pounds of shortening to each 100 pounds of flour used in the production of bread. Since the end of the war, the supply of fats and oils has again become plentiful, restrictions have been removed, and some bakers appear to be increasing the amount of shortening employed in bread production so that it approaches the higher prewar level.

The Director of the Fats and Oils Branch, Production and Marketing Administration, Department of Agriculture, testified that the only data available from a Government agency concerning the use of shortening in bread production was a study conducted by an official of the Food and Drug Administration of 421 samples of commercial bread collected from various sections of the country in 1949, which showed the total fat content to be about 4.8 percent of the weight of the flour. Since the fat naturally contained in white flour is about 1.5 percent, the added fat level, according to the survey, would be about 3.3 percent of the weight of the flour. It was the opinion of this witness, and that of other witnesses, that the use of chemical emulsifiers permits a reduction of the amounts of shortening, milk products, and eggs which customarily have been employed in bread, rolls, cake, and other bakery products (70). The witness declared:

The record of the bread-standards hearings contains evidence of distribution among bakers of advertising material advocating the replacement of fats, oils, eggs, and milk, by emulsifiers. The use of such products as components of food may work to the disadvantage of our farm economy by displacing farm products normally used. The record indicates that natural food constituents, such as fats and oils, probably will be reduced in many commercial bakery products if bakers are allowed to employ these emulsifiers (71).

In order to obtain some information on this subject, your committee invited a limited number of bakers to provide data on their formulas and the actual amounts of ingredients used in one of the postwar years. Useful information was obtained from 22 wholesale baking companies, whose total yearly production of white bread in 1948 or 1949 amounted to more than 2,600,000,000 pounds, or roughly about one-fifth of the total bread production of the industry.

Thirteen of these baking companies made 685,694,686 pounds of bread in 1 year, with 9,047,319 pounds of shortening, 9,996,593 pounds of skim-milk solids, and 971,500 pounds of a commercial brand of polyoxyethylene monostearate as a chemical softening agent. The shortening employed, based on the flour used as 100 percent, was computed to be from 1.2 to 3 percent, with an average close to 2 percent. Only 3 of those 13 companies used more than 2 percent shortening.

A second group of nine large baking companies produced in 1 year 2,005,013,823 pounds of bread, with 37,582,284 pounds of shortening and 40,778,508 pounds of skim-milk solids. No chemical emulsifiers of the polyoxyethylene monostearate type were used by this group of bakers. The shortening, which included some mono- and diglycerides of fat-forming fatty acids, averaged 2.79 percent, with a range of from 0.5 percent to 4.86 percent, based on the weight of the flour used. Percentagewise, the group of bakers who did not employ the chemical emulsifiers in bread production used an average of 41 percent more shortening, and 38 percent more skim-milk solids, than the group of bakers who used the chemical type of bread softener.

When the polyoxyethylene monostearate type emulsifiers were first marketed to the baking industry on a large scale in 1947, the price of shortening was high. Thirteen bakers at the bread hearings conducted by the Food and Drug Administration testified that salesmen for a few of the companies selling bread softeners had informed them that the amount of shortening in their bread could be reduced by the use of polyoxyethylene monostearate. Most of these bakers reduced their

shortening about 50 percent when they started to use this surface-active agent (72). Some early advertisements of certain chemical softeners recommended the softeners as substitutes for lard and shortening (73).

Commercial cake manufacture accounts for a substantial proportion of the annual dollar sales of the baking industry. It also accounts for a large proportion of the total use of shortening and egg products by the industry. The use of emulsifiers permits a reduction in the amount of shortening used in commercial cake production (74).

There are no statistics concerning the effect of emulsifiers on the amount of egg products used in commercial cake production. However, there was testimony that a reduction in the fat content will virtually require a reduction in the egg content (75). Historically, the first of the newer emulsifying chemicals sold to cake bakers was offered as a substitute for eggs during the war when eggs were scarce. A synthetic yellow dye could be added to provide the color formerly obtainable through the use of eggs. The utilization of synthetic yellow dye in commercial cake was practiced before the war. There are indications that the use of artificial coloring matter is increased when quantities of whole eggs or egg yolks are reduced in commercial cake formulas.

A single example may be cited of the changes in formula of a commercial layer cake made by one baking company. This company reported that in 1939 its batter for yellow layer cake was made by mixing the following ingredients, in the quantities indicated: sugar, 30 pounds; sirup, 2 pounds; flour, 30 pounds; frozen whole eggs, 15 pounds; synthetic egg-color solution, three-eighth ounce; vegetable shortening, 10 pounds; nonfat dry-milk solids, 2 pounds 8 ounces; salt, 8 ounces; baking powder, 1 pound 8 ounces; flavoring, 4½ ounces; water, 25 pounds. In 1949, this same company made yellow layer cake batter according to the following formula: sugar, 40 pounds; sirup, 4 pounds; flour, 42 pounds; starch, 5 ounces; frozen whole eggs, 9 pounds; synthetic egg color solution, three-fourth ounce; vegetable shortening, 7 pounds; nonfat dry-milk solids, 4 pounds; salt, 1 pound; baking powder, 1 pound 14 ounces; flavoring, 6¼ ounces; water, 35 pounds; synthetic emulsifier, 8 ounces in 2 pounds of water. On a percentage basis, the cake batter in 1939 contained 13 percent eggs, and 8.6 percent shortening. In 1949, the cake batter contained 6.2 percent eggs, and 4.8 percent shortening, with somewhat less than 0.3 percent of synthetic emulsifier.

The extent of the effect of the use of chemical emulsifiers upon the market for wholesome agricultural products, such as shortening and eggs, cannot be described with certainty. It is impossible, therefore, to assess the economic impact of emulsifiers on the agricultural economy. It may be stated, however, that the availability of synthetic emulsifiers and synthetic coloring matter simulating the color of egg yolk has been a deterrent to a more liberal use of shortening and eggs by the baking industry (76).

The provisions of the Federal Food, Drug, and Cosmetic Act concerned with the labeling of food ingredients do not require a full disclosure of the ingredients or of their percentages or proportions. The statute provides that the labels of foods such as cakes and similar baked goods, for which a definition and standard of identity has not been prescribed by the Federal Security Administrator under section

401 of the act, must list the ingredients contained in such articles; it does not require the label to declare the percentages or proportions of such ingredients. The labels of those foods, such as bread, for which a definition and standard of identity has been prescribed, are not required by the act to reveal either the names of the ingredients or their percentages or proportions.

VI. INADEQUACY OF PRESENT LEGISLATION

It is generally agreed that pretesting of chemicals to insure their harmlessness before they find their way into the Nation's food supply is a necessity if the public health is to be protected. The inadequacy of existing laws to furnish this safeguard is exemplified by the testimony of representatives of the United States Food and Drug Administration that, of 704 chemicals employed in food use today, only 428 are definitely known to be safe (77).

With few exceptions, the witnesses who appeared before the committee were of the view that existing laws dealing with the use of chemicals in the production and processing of food products are not adequate to protect the health of the consuming public. They testified to the serious lack of scientific data concerning the harmlessness of products used in and on many common and basic foods, and agreed that careful pretesting by competent investigators would greatly minimize the public health hazard from this source.

It is gratifying that important segments of the food industry have been in the forefront in advocating more comprehensive legislation so that the public may be better protected. Representatives of such organizations as the Beech-Nut Packing Co., General Mills, Inc., Pet Milk Co., Swift & Co., and others communicated to this committee their concern regarding the inadequacy of existing law, and urged that remedial legislation be enacted. The general counsel for the Grocery Manufacturers of America summed up the problem as follows:

[The Federal Food, Drug, and Cosmetic Act] is not effective to prevent unsafe chemical additions to food before its sale to consumers. For it only applies to food after its introduction into interstate commerce; it may only reach the injury to a consumer thus sought to be avoided, after it has occurred; and it does not require an indicated advance scientific determination whether a chemical addition to food is safe, which alone can prevent that injury (78).

Many qualified witnesses recommended that a section generally similar to the new drug section of the Federal Food, Drug, and Cosmetic Act be added to the statute. This would require that proof of safety of a proposed chemical additive be submitted to the Food and Drug Administration before the chemical is permitted to be used in or on a food product (79). The former Commissioner of the Food and Drug Administration took the position, similar to the viewpoint advocated by many of the other witnesses before the committee, that:

I firmly believe, gentlemen, that the public interest and the interest of honest manufacturers require that an amendment to the food chapter of the law, quite comparable to the new drug section, be passed by the Congress.

I feel that no new chemical or no chemical that is subject to any question as to safety should be employed until its possible injurious effect, both on an acute and on a long-time chronic basis, has been shown to be nonexistent. In other words, any chemical that is proposed for use ought to be proved in advance of distribution in a food product to be utterly and completely without the possibility of human injury (80).

A number of witnesses suggested that an advisory board be appointed to assist the Food and Drug Administration in determining the safety of a chemical proposed for use in a food (81).

The new drug section was enacted as a result of a considerable number of deaths resulting from the sale of untested drug products. One manufacturer, who wished to distribute sulfanilamide in liquid form, added diethylene glycol to the drug as a solvent. Diethylene glycol, which is the main ingredient in an antifreezing agent employed in refrigerating systems, is a deadly poison. Without testing the possible toxicity of the mixture, 240 gallons were put on the market. Its use resulted in more than 100 deaths. Shortly thereafter, several deaths occurred from a so-called cancer serum made from pieces of meat which had become contaminated with tetanus organisms (82).

This section prohibits the distribution of a new drug in interstate commerce unless the Federal Security Administrator is satisfied, on the basis of evidence submitted by the party sponsoring the use of the new drug and other available evidence, that it is safe for use as recommended in its labeling. Approximately 8,400 new drug applications have been filed since 1938, of which about 5,850 have been approved. Almost all of the remaining 2,500 applications were found to be based on incomplete data or to pertain to products which were not in fact new drugs, or were voluntarily withdrawn by the manufacturer after the Food and Drug Administration had determined that evidence of safety was insufficient. Only 11 applications were formally rejected, and only 1 such rejection resulted in an appeal by the manufacturer to a United States district court, which sustained the decision reached by the Government.

The drug industry has welcomed this provision of the law, and has indicated satisfaction with its administration (83). A leading drug manufacturer has pointed out that, under the new drug section, the public has been given needed protection from irresponsible drug marketing without any hampering of free enterprise or drug discovery, and that a large majority of the industry would "recommend a head examination for any manufacturer who wanted to repeal the new drug provisions of the law at this late date." This manufacturer concluded:

It is true that most of the big-name, full-line houses—houses like Lilly, Upjohn, Squibb, Abbot, and Parke, Davis, for example—had long maintained rigorous manufacturing controls, high-quality standards, large-scale pharmacological and clinical testing of new products, and other standards which the new drug section compelled the whole industry to adopt. But there is no indication that the law has wrought hardship on any company, large or small, except perhaps for its desirable discouragement of fly-by-nighters who might otherwise have exploited and possibly endangered the public. On the contrary, the law has profited the whole industry to the extent that the public, including the medical profession, now takes for granted the purity and quality of all drugs on the market and their safety when used in accordance with labeled instruction (84).

At present there are no provisions in the food chapter of the Federal Food, Drug, and Cosmetic Act comparable to the new drug section. Section 402 (a) (1) declares a food to be adulterated if it bears or contains any poisonous or deleterious substance which may render it injurious to health. This provision places on the Government the burden of proving by a preponderance of the evidence, in a court of law, that a chemical added to food is harmful. In some instances, the Government does not possess the necessary proof of hazard,

although doubt as to safety may exist. In other instances, the Government secures the necessary proof, but only after injury has occurred.

Thus, if a chemical is used on or incorporated into a food without adequate toxicity testing, as a practical matter the Government is frequently helpless and the consumer unprotected. If there is no evidence available as to the toxic nature of the substance, the Government cannot produce evidence in court to sustain its burden of proof. In such a situation, the Government may be compelled to undertake the burden of conducting chronic toxicity studies. Such experimental work may require years for completion. Meanwhile, the manufacturer may continue to market its product unmolested despite possible subtle damage to the health of the consumer.

A comparable situation could not exist under the new drug section. If evidence of safety was not generally available for a product which a drug manufacturer proposed to market, it would be a "new drug." The Federal Food, Drug, and Cosmetic Act defines a "new drug" as a drug "not generally recognized, among experts qualified by scientific training and experience to evaluate the safety of drugs, as safe for use under the conditions prescribed, recommended, or suggested in the labeling thereof." If such a product were shipped in interstate commerce, under existing law it could be seized wherever found and condemned in an appropriate United States district court. In a proceeding of this character, the Government would be required to prove only that the drug is not generally recognized as being safe for use and that no new drug application is in effect for it. The Government would not have the burden of establishing that the product was unsafe.

Under section 402 (a) (2) of the act, a food is deemed to be adulterated if it bears or contains any added poisonous or deleterious substance which is unsafe within the meaning of section 406. The latter section provides:

any poisonous or deleterious substance added to any food, except where such substance is required in the production thereof or cannot be avoided by good manufacturing practice, shall be deemed to be unsafe for purposes of the application of clause (2) of section 402 (a); but when such substance is so required or cannot be so avoided, the Administrator shall promulgate regulations limiting the quantity therein or thereon to such extent as he finds necessary for the protection of public health, and any quantity exceeding the limits so fixed shall also be deemed to be unsafe for purposes of the application of clause (2) of section 402 (a).

The primary purpose of section 406 was to provide a means by which maximum residue tolerances on food could be established for needed pesticides so as to protect the public health. The Food and Drug Administration has completed hearings to establish tolerances on a large number of pesticides, and regulations are now being formulated. But the setting of tolerances does not give the Food and Drug Administration any advance control over the use of pesticides. Unless the manufacturer conducts adequate chronic toxicity tests for a new pesticide, the Government is powerless to afford the consumer any protection until it completes its own toxicity tests and conducts a formal public hearing for the purpose of issuing tolerance regulations. Both procedures consume more time than is consistent with efficient protection of the public health.

The Federal Insecticide, Fungicide, and Rodenticide Act prohibits the adulteration and misbranding of pesticides sold in interstate commerce, and requires that a manufacturer of an economic poison

register it with the Secretary of Agriculture before distributing it in interstate commerce. When registering a pesticide, the manufacturer is required to submit a complete copy of the labeling accompanying the economic poison and a statement of all claims to be made for it, including the directions for use. If requested by the Secretary, the registrant must supply a full description of the tests made and the results thereof upon which such claims are based. The Secretary may also require the formula to be submitted. However, the act requires that the Secretary register an economic poison even though he is not satisfied with the data submitted, if the manufacturer insists that he do so.

A representative of the Department of Agriculture testified that section 4 (a) (4) of that statute, which provides that the material filed in connection with the application for registration shall include, if requested, a full description of the tests made and the results thereof upon which the claims are based,

* * * does not sufficiently require that adequate tests be made and place the responsibility upon the applicant to prove the safety and effectiveness of his product. The law would be much stronger if the applicant was required, in those cases where the information was not otherwise available, to bear the burden of proof of the effectiveness and safety of his product for the uses intended. As a prerequisite to registration, he should be required to carry out adequate testing, both as to possible toxicity hazards and effectiveness, and include with the application a complete report of results of such tests (85).

In discussing the "registration under protest" provision of the Insecticide Act, he pointed out:

The provision for registration under protest has not, up to the present, caused difficulty insofar as toxic residues on foods are concerned. However, it is quite conceivable that a manufacturer might desire to apply an economic poison on food crops in a usage which was not considered safe and demand registration under protest, which would have to be granted. The law would be stronger if the provision for registration under protest were omitted and authority given to refuse registration unless it appeared to the Secretary that the composition of the article is such as to warrant the proposed claims for it and that the article and its labeling and other material required to be submitted comply with the requirements of section 3 of the act. Such authority should, of course, be properly safeguarded to prevent arbitrary or capricious action (86).

Furthermore, the Insecticide Act does not require a manufacturer to furnish suitable methods of analysis for determination of residues on the food involved (87). Thus, while the Federal Food, Drug, and Cosmetic Act places upon the Food and Drug Administration the responsibility of safeguarding our food supply from poisonous and deleterious substances, an insecticide may be registered under the Insecticide Act, and enjoy widespread use, despite the fact that the Food and Drug Administration, as well as the vitally concerned food canner and distributor, may have no method of determining the quantity of the economic poison which remains in or on the food.

Representatives of those who manufacture and sell pesticidal chemicals, and a number of entomologists, expressed the view that present legislation in this field is adequate to protect the public (88). Several favored what one witness admitted could be described as "the human guinea pig approach." This entomologist maintained that:

The really significant test is to feed a considerable amount of naturally contaminated food to a numerous group of people, taking care to duplicate the technique used in testing a new drug, that is, starting with very small amounts and increasing until some effect is noticed or it is reasonably certain that none will develop. How can this be done? It is already being done in an unplanned way with every new agricultural chemical (89).

Some of these witnesses also took the position that if existing pesticide legislation were changed in any manner, the result would impose a serious burden upon the farmer (90). Representatives of the farmer, however, do not appear to share this concern. The legislative counsel for the National Grange, the oldest national farm organization in the United States, testified that the development of new chemicals for use in or on foods had intensified and created new problems, and that the grange believed that changes were required in existing legislation in order to deal with these problems (91).

In commenting on the inadequacies of the Insecticide Act, the general counsel for the Grocery Manufacturers of America advised the committee:

Now it is clear that this act is not an appropriate and adequate legislative remedy against the unsafe addition of a pesticidal residue on or in natural food which may be dangerous to the public health; for, in the first place, it is an economic law to aid the farmer rather than a health law to protect the consumer, and it is designed to regulate the agricultural use of poisonous pesticides in growing natural food which actually cause a toxic residue on or in it. In the second place, this act does not expressly provide a due control of such a toxic residue, and it is so loosely drawn that a manufacturer of a poisonous pesticide may operate under it without scientifically making the advance residue determinations which are necessary to protect both the consuming public and an affected food manufacturer. That must be so, because the public-health danger of a toxic pesticidal residue exists and has increased despite this act. And, in the third place, the unsafe addition of a pesticidal residue on or in natural food should be duly regulated by the FDC Act instead because it is our national food law to assure a safe use of food. That act now partly regulates a toxic pesticidal residue, as we have seen; and manifestly it should complete that regulation, to the extent this is required for the protection of public health (92).

Section 401 of the Federal Food, Drug, and Cosmetic Act authorizes the Federal Security Administrator to define and standardize foods for the purpose of promoting honesty and fair dealing in the interest of consumers. This empowers him to determine whether a chemical proposed for use in a standardized food has been demonstrated to be safe. Hearings conducted by the Food and Drug Administration leading to the issuance of regulations defining and standardizing foods have been unduly protracted at times, because of the submission and consideration of conflicting testimony on the safety for use of some proposed optional ingredient. It would seem preferable that food standardization hearings should not be devoted to that type of question, but rather to the economic factors implicit in the criterion of "honesty and fair dealing in the interest of consumers." A provision in the food chapter of the statute generally similar to the new drug section would help to prevent these burdensome delays in the promulgation of food standards.

More important is the fact that there are many food products on the market which are not, and may never be, standardized. The Administrator has no advance control over the use of chemicals in an unstandardized food. This differs from the situation which exists in the case of meat products. The Federal Meat Inspection Act requires that a meat packer who is subject to the statute, and wishes to use a chemical, must first obtain the approval of the Meat Inspection Service of the United States Department of Agriculture. He is required to show, among other things, that the proposed chemical is harmless, and the burden of proving its freedom from toxicity is on him.

If, after reviewing the data submitted by the petitioner and all other available data, the Meat Inspection Service is convinced that the

chemical is safe, permission to use it is granted; otherwise, it may not be employed in meat products. It is anomalous that certain chemical "emulsifiers" have not been permitted in such products but, as indicated, are widely used in many other foods. It is this general type of advance safety control exercised since 1906 over the use of chemicals in meat products that was proposed for other foods by many of the witnesses.

VII. CONCLUSIONS AND RECOMMENDATIONS

The increasing use of chemical additives in the production, processing, preservation, and packaging of food has created a serious public-health problem. The evidence presented reveals that existing Federal laws do not provide complete protection to the public against the addition of chemicals which may be unsafe.

The strong recommendation of most of the witnesses before the committee was that no chemical should be permitted entry into the Nation's food supply until its safety for use has been demonstrated beyond a reasonable doubt. A provision in the law to that effect would benefit the food and chemical industries as well as the consuming public (93). Thus, the Director of the Bureau of Nutrition of the Department of Health of New York City told the committee:

I would think that the industry, meaning the chemical industry or food industry in general, would welcome an outside authority, a nonprejudiced outside authority, to pass judgment upon the adequacy of safety tests that responsible members of industry itself use before they apply it to food. Certainly the chemists and scientists in these organizations can be put under tremendous pressure by management and many of them, I am sure, would welcome the final judgment of an outside source whether or not the addition of a new chemical may or may not constitute a health hazard (94).

In the committee's view, it is important that unnecessary obstacles to technological improvements in food production and processing not be created. It is believed that a "chemicals in food" amendment to the Federal Food, Drug, and Cosmetic Act would not hamper scientific improvement in this field, but rather would stimulate research, aid in technological improvement, and redound to the benefit of the food and chemical industries. It is interesting to observe, in this connection, that the New Drug Section has given new impetus to pharmaceutical research, and new strength to the ties between drug manufacturers and medical research facilities outside the industry (95).

It is clear that before a chemical is used in or on a food, or as a food, it should be subjected to acute and chronic toxicity testing to insure, as far as possible, that the public health will not be endangered. It is not possible to delineate, in any legislation, the specific methods or conditions of testing which should be performed on any chemical or class of chemicals. The specific type and duration of tests necessary to insure the protection of the public health will vary, depending on the composition of the chemical and the food involved, the breakdown products of the chemical and food when brought into contact or intermingled, the metabolic fate of the chemical, the quantity of the chemical or related chemicals already found in the diet, and many other factors. For this reason, your committee recommends that legislation to cope with the chemicals in food problem should not attempt to specify the type and manner of pretesting which should be conducted. Rather, the legislation should provide that evidence

that the chemical is safe, and does not produce harmful chemical reactions, in the end food product, should be submitted to the Food and Drug Administration for clearance before the chemical is utilized. In any evaluation of the safety of any proposed chemical, the extent of the use of the chemical, or similar chemicals, in or on other foods, must be taken into consideration.

It was suggested by some witnesses that any legislation should treat insecticides differently from chemicals which are added to a food product after harvesting. It was contended by these witnesses that insecticides are not deliberately added to foods as are most other chemicals used for food purposes, and that the amount of the insecticide remaining on the food is not a constant one, as may be the situation in the case of other chemicals. However, insecticides, as well as other chemicals used in the production and processing of food products, are deliberately rather than accidentally utilized to perform a specific function with regard to the food in question. It is true that it is not customarily intended that insecticides appear on the end food product, but under certain conditions, particularly when proper precautions are not taken, they may so appear, in greater or smaller quantity. It is little comfort to the consumer that the manufacturer or applier did not intend that the insecticide remain on the food product, or at least not in such great quantity.

It is essential that, before a pesticide is permitted to be used on a food, reliable methods of analysis for the quantitative determination of the chemical be available. Some insecticides were widely used before such information had been obtained, and insecticides are presently being employed for which such methods are not available. The importance of this requirement is obvious. If the quantity of chemical in or on the food cannot be ascertained, it cannot be determined whether or not any hazard is involved. However, only part of the question is answered when the quantity of the particular chemical in the diet is established. This information is meaningless unless the effect this quantity will have on the human body when ingested both for long and short periods of time, and by all segments of the population, is also known. The continued high level of health and vitality of our Nation demands that both of these questions be answered regarding any alien material which may find its way, in any amount, into our food supply.

Your committee recognizes the need for supplemental legislation which will provide more adequate protection to the public. While the committee is in agreement with the opinions expressed by many of the eminent witnesses who testified, that no chemical should be permitted in or on the Nation's food products until its safety for the use for which it is employed has been demonstrated beyond a reasonable doubt, it also recognizes the necessity for the continued use of chemicals in sprays and other insecticides if the Nation is to be supplied with food. In the committee's investigation, which included inspection of the facilities used in the production and processing of a number of the items contributing to the food supply of this Nation, it has been convinced that with proper care, and by taking reasonable precautions, it is possible to utilize the poisonous properties of such chemicals in destroying insects and controlling diseases which attack many crops, without endangering the health of the people who consume

these products. The committee does not believe that an insecticide which can be used without danger to the consuming public, and with benefit to the grower, should be kept from the market because of the failure of a few to observe the recommended directions for use.

In conclusion, the evidence has convinced your committee that chemicals have been utilized in and on the food supply of the Nation without adequate and sufficient testing of their possible long-range injurious effects; that the public is entitled to greater protection with respect to the foods it must necessarily consume; and that such protection is not afforded by existing legislation, under which the Government may take no action until after the food has been placed upon the market and injury may have occurred. Your committee recommends, therefore, that the Federal Food, Drug, and Cosmetic Act be amended to require that chemicals employed in or on foods be subjected to substantially the same safety requirements as now exist for new drugs and meat products. Adequate provisions for a comprehensive judicial review of administrative decisions should be included in such an amendment.

Respectfully submitted.

JAMES J. DELANEY, New York, *Chairman*.
E. H. HEDRICK, West Virginia.
PAUL C. JONES, Missouri.
A. L. MILLER, Nebraska.
GORDON L. McDONOUGH, California.

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¹ Citations are to representative references and are not intended to reflect all supporting testimony. All reference citations indicate the committee hearing volume involved and the page numbers in that volume. The designation "1950" refers to the 878-page volume of the committee hearings held during 1950, entitled "Chemicals in Food Products, Hearings Before the House Select Committee To Investigate the Use of Chemicals in Food Products, Eighty-first Congress, Second Session." The designation "Part 1" refers to the 582-page volume of the hearings held during 1951, entitled "Chemicals in Food Products, Hearings Before the House Select Committee To Investigate the Use of Chemicals in Food Products, Eighty-second Congress, First Session, Part 1." The designation "Part 2" refers to the volume containing pages 583—1053 of the hearings held during 1951, entitled "Chemicals in Foods and Cosmetics, Hearings Before the House Select Committee To Investigate the Use of Chemicals in Foods and Cosmetics, Eighty-second Congress, First Session, Part 2." The designation "Part 3" refers to the volume containing the hearings held during 1952, entitled "Chemicals in Foods and Cosmetics, Hearings Before the House Select Committee To Investigate the Use of Chemicals in Foods and Cosmetics, Eighty-second Congress, Second Session, Part 3."

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The United States Food and Drug Administration reveals that there are now more than 700 chemicals used in some manner in the production of foods. This makes chemicals in foods a most important problem. Science has made great progress in the use of chemicals in foods. There are some 250 of these 700 chemicals that are being used, although their safety in the production and processing of foods has not been established to the satisfaction of the Food and Drug Administration. To us this presents a serious problem.

We believe that no chemical should be added in foods sold for human consumption until its safe addition has been adequately determined by appropriate scientific investigations. It does seem that the law should require the proper testing of any chemical to determine if it is harmful, before that chemical is added to the food supply. Unless this is done the consuming public is not being properly protected. The law of the land should safeguard the public health.

Food must be safe for human consumption. As we understand the present law, it does not require a pre-testing of chemicals before their use in foods as it does for the use of drugs. While the law prohibits the addition of unsafe chemicals in foods, it does not set out in a clear way how this shall be done. The Administration writes certain definitions, composed in such a way as to exclude any unsafe addition.

The present law is defective because a violation may not be disclosed until these foods have been sold or consumed in large quantities. The present enforcement under the law is a long procedure. The Government must prove the violation. In the meantime the consumer is left exposed to chemicals which might prove dangerous. The present requirements should make certain that the addition of the chemical to the food is safe. The burden of proof as to the safety of the chemical should rest upon the industry.

We do feel that the food industry has been diligent in protecting foods which are safe and they have carried on extensive experiments cooperating with Government and health agencies to the end that the public will have proper protection. It is always the case, however, that during the stress of economic competition short cuts are

ADDITIONAL VIEWS ON THE USE OF CHEMICALS, ESTROGENIC HORMONES, AND PESTICIDES IN THE PRODUCTION OF FOODS

We have hesitated to state some additional views on this subject. Our views are not in disagreement with the full report. We agree with the full report and have signed it. We did feel that because of the importance of these three topics some additional thoughts in relation to chemicals, estrogenic hormones, and the use of pesticides in the production of foods would be in order.

CHEMICALS IN FOODS

The United States Food and Drug Administration reveals that there are now more than 700 chemicals used in some manner in the production of foods. This makes chemicals in foods a most important problem. Science has made great progress in the use of chemicals in foods. There are some 276 of these 700 chemicals that are being used, although their safety in the production and processing of foods has not been established to the satisfaction of the Food and Drug Administration. To us this presents a serious problem.

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frequently adopted which may put the consuming public in danger of chemicals being used that are not properly pretested or safe.

The law should be clarified and strengthened in order to protect the public from those concerns who seek short cuts in the production and processing of food that may be dangerous to the public. We are certain the food industry will cooperate 100 percent with Government agencies and the Congress in supplying an ever-increasing need for food which is safe for human consumption.

ESTROGENIC HORMONES IN FOOD

This is a new field. It may offer much hope in the production of meat. There are some dangers apparent which the public should understand.

The importance of producing chickens with the aid of estrogenic hormones is evidenced by the fact that more than 30 million chickens were treated with the hormone pellets last year. There are certain dangers which should be pointed out. The mink growers of Wisconsin and Illinois have a bill pending before Congress, asking for damages because they fed the heads of chickens to their mink; the chickens had been treated with the hormone pellet, the mink were sterile. Does the Government owe these mink growers damages because they followed the advice of the Agriculture Department and fed the heads which had a residue of the estrogenic hormones in the flesh?

In our opinion there has not been sufficient study to permit the indiscriminate use of estrogenic hormones in the production of meat. It seems quite possible that chickens and other meat which has been treated with the hormones should be so labeled when offered for sale to the public. We are convinced that there are dangers in eating the heads of chickens, the livers, and other products, because they might contain excessive amounts of hormones which would be harmful. The individual cannot buy hormones without a prescription from a physician. It is possible for chicken producers and others to buy these pellets without any restrictions from drug houses.

The problem requires more study. We would not want to place any blocks in the way of progress, because this brand new field may prove to be a valuable one when it comes to the production of meat. It may well reflect to the benefit of agriculture and the consuming public. It does seem that additional experiments need to be done before the green light is given to the widespread use of these estrogenic hormones.

PESTICIDES

More than 30,000 formulas have been registered with the Department of Agriculture for use in the battle between man and insects. The chemical industry has produced these new and powerful insecticides to cope with the problem of protecting the food supply of the Nation. Many of these pesticides are extremely toxic. Our concern is with the fact that the housewife frequently fails to realize that insecticides such as DDT, chlorodane, selenium, and many others in combinations, which can be bought over the counter, are deadly poison and must be used with extreme caution. When these pesticides are used upon fruits and vegetables, these crops should be thoroughly washed before they are used. In fact we doubt very much if some of

these new, powerful insecticides should be authorized for private home use on growing garden and fruit crops.

There was a time when the widespread use of DDT was urged on dairy farms. Today we realize that DDT is stored up in the fat and is a poison.

The commercial producers of these pesticides are doing an excellent job and are cooperating in every way with Government and health agencies in the protection of the public. The laws may be sufficient to protect food in interstate commerce. Much of the food used on the family table is produced in the garden at home. It is this important segment of food consumers which should be given every assistance and direction in the use of the many pesticides now available on the market. The careless, indiscriminate use may cause chronic illness to the family. We are convinced the public has not been properly alerted as to the dangers from the improper use of these pesticides. The individual may not die from their use, but he becomes ill; and there can be serious damage to the liver, kidney, and other vital organs. We believe the toxic insecticides, like chlorodane, selenium, and others of similar toxic nature, should not be offered to the public for use without proper controls.

There are also certain sprays that the housewife uses around the house which are extremely toxic. The public often feels that because something can be bought over the counter it must be safe. There are many dangers connected with the improper use of sprays around the house.

In presenting these additional views we do not want to be an alarmist, because in our opinion it would not be possible to produce the fruits and vegetables we now produce or to control insects unless some of the new and powerful insecticides were used. We believe the large industries which manufacture these insecticides and the food industry which must use the insecticides are using every effort possible and cooperating in every way with Government and public-health officials in seeing that no residue of the poison remains upon a food offered to the public for consumption. The great danger lies in the careless use of these sprays and insecticides by the general public upon their home gardens.

The general public needs more education and should be alerted at all times to the dangers when they are using some of these powerful new sprays and insecticides.

A. L. MILLER.

GORDON L. McDONOUGH.

ADDITIONAL VIEWS OF CONGRESSMAN GORDON L. McDONOUGH

The rigid requirements of the State of California to protect the public by requiring the label on all insecticides and pesticides, to carry the name of the poison and the amount, together with the antidote for such poison, and also the rigid inspection of fruits, vegetables, and flowers on which they are used, are recognized as one of the best State regulations to protect the public and the workmen engaged in the agricultural industry against serious industrial hazards.

GORDON L. McDONOUGH.

33

MINORITY VIEWS

It is with great reluctance that I find it necessary to write this minority report. I have tried to make my views and my position completely clear not only to the counsel and staff of the Select Committee To Investigate the Use of Chemicals in Foods and Cosmetics but also to the members of the committee.

Subsequent to my original criticisms of the report of June 25, some changes were made in the proposed report. However, in my opinion the changes have been inconsequential and do not meet my objections.

On Monday, June 30, 1952, I met with the counsel of the committee, Mr. Kleinfeld and Mr. Gottlieb, and two members of the committee in an attempt to point out some of the deficiencies in the report as revised.

Since no agreement was reached, I feel it is my duty to make my views quite clear in a minority report.

The whole essence of my objections to the report submitted to me by counsel for our committee is that the report is "alarmist" in nature. It would, in my opinion, contribute to the difficulties of our producers of foodstuffs in the United States and yet add nothing of assurance to the consuming public.

This is a matter of grave concern.

Since 1946, according to the Food and Agriculture Organization of the United Nations, the world population has increased 12 percent, while world food production has increased but 9 percent. There is real foundation for the statement that actually man is breeding and eating himself out of house and home. There is real foundation for the FAO's estimate that half of the world's 2,400,000,000 population exists on a near-starvation diet. It is in the light of these facts that I protest a nonconstructive approach to any discussion of the use of chemicals in foodstuffs at this time.

Even in our own Nation, which is the best fed in the world, we face the possibility of a food shortage within the next 23 years. Today, on an estimated 462 million productive acres, we are feeding our population of 155 million. Yet, like the rest of the world, our population, too, is increasing at the rate of nearly 2½ million persons a year. By the year 1975 our population by conservative estimates will be 190 million persons. To serve our consuming public with today's menu will require an additional 115 million acres.

Only some 45 million acres by conservative estimate appears possible as an increase through reclamation, drainage, and other processes. We stand the chance of being 70 million acres short of that required to feed our own population. To overcome this means that we must employ every safe advantage or benefit to be gained by science in the conservation or maintenance of our fertile acres in the proper use of every new soil-building and plant-food-producing chemical and in the wise and safe use of every conservative pesticide that will protect our crops in the future from the invasion of pests and insects.

I am convinced that the majority report as presently constituted adds nothing in this direction and therefore I cannot be a party to it. I feel very strongly that the report is reactionary and a deterrent to needed progress.

While parts I and II of the report as submitted to me on June 25 and unchanged in later presentations are subject with one exception, later referred to in my conclusions, to my endorsement, I find part III to be fraught with inequities and inaccuracies. To my mind, it does but little good to discuss, as is done in the beginning of part III, seven chemicals which are by today's legal procedures denied access to interstate commerce. Far better to have mentioned those seven chemicals by name and to have assured the consuming and producing public of the efficiencies of our tax-supported agencies which have succeeded in denying these chemicals the privilege of interstate commerce.

And, again, in part IV, the report indicates that selenium may be used as an agricultural insecticide. Selenium has been registered by the Department of Agriculture under the Insecticide Act of 1947 for only one crop use and for use on ornamentals and certain greenhouse purposes. It has not been registered for use on any other food crop and its sale for use on any other food crop would be illegal and the product could be seized under existing law. Selenium is not permitted on apples and the indirect reference to its use thereon is not only unfair—it is destructive.

It is one thing to raise an alarm; it is another thing to put out the fire.

Again, in the discussions of the use of chemical emulsifiers used in a wide range of foods, as it appears in part III and again is enlarged upon in part V of the report, it should be borne in mind that the harmful toxicity of emulsifiers has never been proven.

The burden of testimony would lead one to the conclusion that they are nontoxic and therefore any discussion of them is economic rather than a question of the effect of the health of individuals.

With reference to the use of hormones in food production, I think it only fair to point out that in part III the statement is made:

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I call your attention to the word "condemned."

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to a fat-rendering plant. On completion of this process *the edible portion of the bird was released for the market.* [Italics mine.]

The basis of my minority report is that adequate legal processes are already in existence for the full protection of the consuming public.

Again, despite the fact that the Food and Drug Administration in this instance permitted these seized birds to reach the market, the committee is expected to recommend: "The committee is of the opinion that poultry or other animals which have been chemically treated be labeled so as to reveal that fact, and that restaurants serving such chemically treated food be required to advise customers to that effect."

It seems to me that before legislation requiring this be entered into that the full import of all the facts be had. Certainly a conclusion upon which to base such a recommendation is not borne out by the testimony before the select committee. Nor would such a recommendation protect the consumer. No more cumbersome a regulation could be imagined.

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"The introduction of numerous synthetic organic pesticides offers promise for increasing the Nation's food supply and improving health through the control of insects and other pests. Past experience, however, indicates that poisons cannot be used safely on food crops without the development of certain fundamental knowledge concerning the poisons. What these materials will do to pests and food crops and to workers who handle them must be known, and there must be developed, also, a knowledge of what these materials will do to warm-blooded animals and man when small amounts of residue are incorporated in their foods. Furthermore, practical methods of analysis should be available to permit identification and measurement of residues that may persist on or in consumer products. Such essential information is undeveloped for many of the agricultural poisons now in use."

This paragraph, a quotation from a 1950 report, no longer is completely true because of additional information now available. This lack of specific knowledge regarding the effects of these chemicals on pests, food crops, and the consumer early was recognized by the Department of Agriculture and the Public Health Service. Both of these agencies have been working intensely on this problem with the result that today we do know a great deal about what these chemicals do to pests, something regarding their effects on crops, and considerable about the fate and toxicity in man. Moreover, we now have practical methods of analysis for most of these chemicals.

The Public Health Service for years has been studying the toxic effects of many of these chemicals on man. Recently their studies on the toxicity of pesticides at Wenatchee, Wash., Savannah, Ga., and in the various Public Health Service hospitals have failed to show a single case of chronic poisoning due to residue of pesticides chemicals in foods. As new pesticides are developed, much research is needed to establish their toxicity for man and the Public Health Service should be adequately supported in these essential studies.

The following was read by counsel when he was interviewing Dr. Fred Bishop of the Bureau of Entomology, United States Department of Agriculture:

The Council on Foods and Nutrition of the American Medical Association is acutely aware of the toxicological problems presented by the rapid introduction of synthetic organic pesticides and herbicides. The chemical contamination of foods with residues of these substances is but a part of the broader problem created by their wide use, for in addition to the danger from ingestion, the effects of inhalation and skin absorption must be determined.

The problem is created by the great number of new pesticides on the market. The appearance of these is creating an increasing volume of inquiries at association headquarters. That danger exists is evidenced by the appalling lack of factual data concerning the effect of these substances when ingested with food. The chronic toxicity to man of most of the newer insecticides is entirely unexplored. In fact, the majority are so new that their limitations and even their full scope of usefulness have not been established.

The counsel for the committee following the reading of the quotation asked Dr. Bishop:

Do you agree with that statement, sir?

Dr. Bishop replied:

I believe that is an editorial and a generalized statement, and I cannot agree with it. "Entirely unexplored," I don't believe that anybody else would agree with that either. I am rather surprised that a statement would appear in that journal as sweeping as that.

I feel that, by their very nature, pesticides should be considered separate from other chemical additives for the following reasons:

1. Pesticides are necessary and must be used to produce food products and to protect the public health. Their use is from necessity and not by choice. These chemicals are present in varying and minute amounts.

2. Pesticides are already controlled by a legislative pattern consisting of Federal and State laws and regulations thereunder. These laws are the Federal Insecticide, Fungicide, and Rodenticide Act of 1947, the Food, Drug, and Cosmetic Act of 1938, State laws in 39 States which in general follow the pattern of the Federal Act of 1947.

The Federal Insecticide, Fungicide, and Rodenticide Act of 1947 requires that before a pesticide can be shipped in interstate commerce, it must be accepted for registration by the United States Department of Agriculture. Registration depends upon a showing that the product is both safe and efficacious for the purposes for which it is to be sold. Supporting data must be made available to the Department before registration is granted. Lack of data will result in a refusal to register. The type of supporting data depending upon the claims made consist of: entomological efficiency, pathological toxicity, residue at harvest, acute and chronic toxicity data, data showing effect on soils, data showing effect on taste and flavor. The solicitor for the Department of Agriculture has ruled that under the Federal Insecticide, Fungicide, and Rodenticide Act of 1947, necessary data can be required before registration to show that the material is not only efficacious for the uses recommended but that it is safe when used as directed to the spray operator and to the consuming public.

The Food, Drug, and Cosmetic Act directs the Federal Security Administrator to limit, by regulation, the quantity of added poisonous and deleterious materials, including pesticides, which remain on any

food "to such extent as he finds necessary for the protection of public health."

Standard procedure under existing laws before a product is registered is that the United States Department of Agriculture consults with the Food and Drug Administration and the United States Public Health Service. Both of these agencies are fully informed before a product can be sold in interstate commerce and the product is not accepted for registration if, in the opinion of any one of those agencies, it would be detrimental to the public health.

Under the State laws, similar controls and authority can be exercised at the State level.

Continued investigation of all phases of the product such as entomological efficiency, pathological toxicity, flavor and taste, effects on soil are continued by the industry, by the United States Department of Agriculture, Bureau of Entomology and Plant Quarantine, Bureau of Plant Industry, State land-grant colleges, the United States Public Health Service, Food and Drug Administration, and the Fish and Wildlife Service. The claims under which the material is registered are reviewed at regular intervals by the Department of Agriculture in the light of any new research data.

It is common practice in the fresh fruit and vegetable industry to wash products after harvest before shipment. This is because the Food and Drug Administration polices all shipments in interstate commerce. This applies to practically every fresh fruit and vegetable. Investment in washing machinery is one of the heaviest capital items in the fresh fruit and vegetable producing, packing, and shipping business. Use of such equipment insures the removal of spray residue. In addition, washing fresh fruits and vegetables in preparation for retail sale is a growing practice. Thus, washing at both wholesale and retail levels affords protection against the presence of toxic residues. Authority now exists under Federal and State laws to bar from commerce any fresh fruit and vegetable product containing toxic residues which might be injurious to health.

In California, for example, under standards set by State law, 2,363 samples of produce were analyzed in 1949 and only 110 were found to contain spray residue in excess of State tolerances. Of course, it should be borne in mind that "tolerances" always err in favor of assurances to the consumer. In 1950, 2,842 samples were analyzed and 103 were found to contain overtolerance amounts; however, the averages and circumstances involved in these cases did not warrant filing criminal complaints. California imports some fruits and vegetables from other States and countries. Analyses of fruits from Oregon, Washington, and Idaho, and of vegetables from Florida, Texas, Arizona, and Mexico during 1950, did not reveal any deleterious residues in excess of legal tolerances.

The chemical industry, in developing a new pesticide, first screens thousands of chemicals to determine their biological efficiency. If one of the chemicals shows promise, research is started on its efficacy for pest control and toxicological research is immediately started to determine its practicability for use. The toxicological and biological research is started by the producing company. When promise is shown, work is expanded in cooperation with private research institutions, the United States Department of Agriculture, and land-grant

colleges. The Food and Drug Administration and the United States Public Health Service are consulted. A recent survey of the industry shows that the cost of research before a product can be registered for sale ranges from \$200,000 to \$400,000.

The Food, Drug, and Cosmetic Act of 1938 has given the Food and Drug Administration full authority to protect the public from any residue hazards from the use of pesticides through the establishment of tolerances. Since 1938 only one official tolerance has been established, namely, on fluorine. In spite of the fact that tolerance hearings have been held on all of the principal pesticides at which 25,000 pages of technical data on residues and toxicity were presented, the residue tolerance hearings were closed on September 15, 1950, nearly 2 years ago, but no tolerances have yet been issued. Data upon every one of the pesticides referred to in section IV of the committee report were included. The control called for does not await new legislation but administrative action according to the existing law.

In the light of these facts, it seems unfair to me to state in part II that there are 276 chemicals being used in foods today, the safety of which has not been established.

This point is again referred to in part VI of the committee report as a basis for new legislation. I feel that the public is entitled to the exact status of the situation.

If any of these are pesticides, why have the regulations provided for in existing law not been forthcoming in this period of time? As not few (as indicated on p. 20 of the committee's report) but many witnesses testified, we should look to better use of authority already provided before concluding that additional authority is needed or could be wisely exercised if granted. In this light the total import of part VI of the report is in contradiction with the burden of testimony from witnesses closest to the subject.

In the final analysis we must designate to some responsible Government agency the determination of that which is or is not deleterious to the public health. We must recognize existing facilities which allow for the licensing of pesticides. Then, having arrived at that point, we must designate the policing agency to maintain a protective procedure so that our consuming public may be assured that what they consume is safe.

In the Public Health Service, the Department of Agriculture, and the Food and Drug Administration we have responsible agencies. Failure on the part of Congress to recognize their abilities to contribute to orderly progress is a sin of omission we must avoid. Failure in this committee's report to point out, at every turn, the good work of these agencies can leave but a negative conclusion with everyone.

We need faith in Government. We need both a feeling of security and encouragement in the hearts of our producers. We should assure the security of the consumer. Our Government is doing that. Let us admit it.

WALT HORAN.

Union Calendar No. 743

82D CONGRESS
2d Session

} HOUSE OF REPRESENTATIVES {

REPT. 2356
Part 2

INVESTIGATION OF THE USE OF CHEMICALS IN FOODS AND COSMETICS

JULY 5, 1952.—Committed to the Committee of the Whole House on the State
of the Union and ordered to be printed

MR. ABERNETHY, from the Select Committee To Investigate the
Use of Chemicals in Foods and Cosmetics, submitted the following

MINORITY REPORT

[Pursuant to H. Res. 74, 82d Cong., 1st sess.]

I concur in the minority views submitted by my colleague, Hon.
Walt Horan, which are as follows:

The whole essence of my objections to the report submitted to me
by counsel for our committee is that the report is "alarmist" in nature.
It would, in my opinion, contribute to the difficulties of our producers
of foodstuffs in the United States and yet add nothing of assurance to
the consuming public.

This is a matter of grave concern.

Since 1946, according to the Food and Agriculture Organization of
the United Nations, the world population has increased 12 percent,
while world food production has increased but 9 percent. There is
real foundation for the statement that actually man is breeding and
eating himself out of house and home. There is real foundation for
the FAO's estimate that half of the world's 2,400,000,000 population
exists on a near-starvation diet. It is in the light of these facts that
I protest a nonconstructive approach to any discussion of the use of
chemicals in foodstuffs at this time.

Even in our own Nation which is the best fed in the world, we face
the possibility of a food shortage within the next 23 years. Today
on an estimated 462 million productive acres, we are feeding our
population of 155 million. Yet, like the rest of the world, our popula-
tion, too, is increasing at the rate of nearly 2½ million persons a year.
By the year 1975, our population by conservative estimates will be
190 million persons. To serve our consuming public with today's
menu, will require an additional 115 million acres.

Only some 45 million acres by conservative estimates appears possible as an increase through reclamation, drainage, and other processes. We stand the chance of being 70 million acres short of that required to feed our own population. To overcome this means that we must employ every safe advantage or benefit to be gained by science in the conservation or maintenance of our fertile acres in the proper use of every new soil-building and plant-food-producing chemical and in the wise and safe use of every conservative pesticide that will protect our crops in the future from the invasion of pests and insects.

I am convinced that the majority report as presently constituted adds nothing in this direction and therefore I cannot be a party to it. I feel very strongly that the report is reactionary and a deterrent to needed progress.

While parts I and II of the report as submitted to me on June 25, and unchanged in later presentations are subject with one exception, later referred to in my conclusions, to my endorsement, I find part III to be fraught with inequities and inaccuracies. To my mind, it does but little good to discuss, as is done in the beginning of part III, seven chemicals which are by today's legal procedures denied access to interstate commerce. Far better to have mentioned those seven chemicals by name and to have assured the consuming and producing public of the efficiencies of our tax-supported agencies which have succeeded in denying these chemicals the privilege of interstate commerce.

And, again, in part IV, the report indicates that selenium may be used as an agricultural insecticide. Selenium has been registered by the Department of Agriculture under the Insecticide Act of 1947 for only one crop use and for use on ornamentals and certain greenhouse purposes. It has not been registered for use on any other food crop and its sale for use on any other food crop would be illegal and the product could be seized under existing law. Selenium is not permitted on apples and the indirect reference to their use thereon is not only unfair—it is destructive.

It is one thing to raise an alarm; it is another thing to put out the fire.

Again, in the discussions of the use of chemical emulsifiers used in a wide range of foods, as it appears in part III and again is enlarged upon in part V of the report, it should be borne in mind that the harmful toxicity of emulsifiers has never been proven.

The burden of testimony would lead one to the conclusion that they are nontoxic and therefore any discussion of them is economic rather than a question of the effect of the health of individuals.

With reference to the use of hormones in food production, I think it only fair to point out that in part III the statement is made:

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